EMGT 835 FIELD PROJECT:
Quality From the Start: A Training Manual for the Engineering Division of Peridian Group, Inc.

By

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An EMGT Field Project report submitted to the Engineering Management Program and the Faculty of the Graduate School of The University of Kansas in partial fulfillment of the requirements for the degree of Master of Science.

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Executive Summary

Peridian Group, Inc. is a small sized consulting firm, with offices in Lawrence, KS and Gardner, KS, providing engineering, planning, surveying, construction, information technology, and graphical animation services. Rapid growth, lack of a formal training program, employee turnover, new clients, review by new municipalities and continually changing design criteria have lead to decreasing production and quality within the engineering division. Management has become frustrated by overruns in budget, costs of redesigning projects and delays associated with resubmittals. In order to correct these problems, a training manual was developed for use by both new and existing employees.

The training manual creates a consistent training program and allows for new information to quickly be given to all employees of the engineering division. The training manual had to be available to employees in two offices, easily accessible, easy to use and easy to update. The training manual is in electronic format on the company intranet. This allows for use by employees in both offices and the manual to be easily updated. A news feature tells users of new or updated material whenever the manual is accessed. Several recommendations for additions to the training manual have been made during early stages of implementation. These recommendations include expanding the manual for use by all departments, creating additional procedures for design software and development of a search engine.

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Introduction

Peridian Group, Inc. is a small sized consulting firm that offers engineering, planning, surveying, construction, information technology and graphical animation services. Founded in 1997, the company has grown rapidly to its present size of 47 employees with offices in Lawrence, KS and Gardner, KS. The engineering division has increased from five employees in 2001 to nine employees in 2004. A high turnover of employees within the division has also taken place within the last two years. The growth and turnover within the engineering division has resulted in the hiring of several new employees within the last few years.

Prior to 2001, turnover was low and new employees were an uncommon occurrence, therefore a formal training manual was never considered. Since 2001, a great deal of time has been spent training new employees. The new employee training has consisted primarily of "on-the-job training", which means new employees are forced to ask questions to get much of their training. In addition, new employees are not all trained by the same employee. The person providing the training depends mostly on the workload of existing employees. Each employee has his own method for training. This has lead to inconsistent and sometimes ineffective training.

During the last few years, Peridian Group has established several new clients. These new clients have resulted in Peridian Group working in several new cities and municipalities. This has resulted in new design criteria, standards, specifications and submittal requirements for projects. Cities and municipalities that Peridian Group has previously worked with or for are often changing or adding new criteria. Knowledge of this new information often lies only with individual employees. This has resulted in projects being designed that do not comply with updated design criteria or that include errors repeated from previous projects.

Lack of a formal training program/manual has increased the time for new employees to become productive, lead to delays in schedule and increased costs to Peridian Group due to the redesign and/or resubmittal of projects. This has created frustration on the part of clients, municipalities reviewing projects and management within the company. A training manual would increase productivity of new and existing employees, increase quality and decrease costs associated with correcting errors and redesigning projects. Therefore, this project develops a training manual for use by new and existing employees in the engineering division. The manual contains the following:

- Introduction to Peridian Group
- Plotting, Scanning & Printing
- Using the Computer
- AutoCAD Standards
- AutoCAD & Land Development Desktop Procedures
- Cities (Contacts, Design Criteria, Submittal Guidelines, etc.)
- Counties (Contacts, Design Criteria, Submittal Guidelines, etc.)
- Utilities (Contacts, Design Criteria, Submittal Guidelines, Standard Forms etc.)
- State Agencies (Contacts, Permits, Submittal Guidelines, Standard Forms etc.)
- Federal Agencies (Contacts, Permits, Standard Forms etc.)

- Engineering Standard Forms

The manual is published on the company intranet. This allows for quick reference by employees and can easily be updated or expanded by the division manager and administrative staff.

Literature Review

A literature review was completed of books and articles containing information for developing and writing employee orientation/training material and manuals. A complete list of material reviewed is contained in the bibliography. All of the material found was before 2000, which probably indicates that not much has changed in the development of training manuals in the last five years. Most of the material focused on development of training material to be used in a training session, rather than a document specifically created to be a continual reference to all employees and not presented in a formal training session. Despite this, a great deal of useful information was discovered during the literature review.

The focus of "Effective Employee Orientation" was on orientation from the need for through development and implementation stages and not specifically on development of training material. However, some concepts related to new employees were taken from the book. For example, in order to make new employees feel welcome, the manual must introduce the employee to the such items as the basics of the company, benefits/services and miscellaneous employee documents, etc (Jerris). This will be very useful in the development of Section 1 of the training manual.

Two of the books reviewed, "The Trainer's Handbook' and "The ASTD Handbook of Training Design and Delivery", were handbooks for use by trainers and those in charge of making training decisions. Much of the information was beyond the scope of this project, but some information was used for analyzing training needs and organizing the training manual. For example, a needs analysis is important in developing the scope and size of a training program. A needs analysis is an examination of the existing need for training within the organization (Mitchell). Several questions to be answered such as, how to get employees to use the manual, how to keep it updated and who will be in charge of it resulted from review of the two handbooks.

The remaining literature review focused mostly on how to write training material and manuals. Several key concepts such as writing style and organization of the manual were taken from this literature. It is important that written material be concise and written in a style that the employee will understand in order for it to be most effective and useful.(Stoneall) "How to Write a Training Manual" and "The Write Training" offered useful information for both the writing style used in the manual as well as the structure and layout of the manual. The structure of the manual is very important. A structure that allows the employee to quickly find the information they are looking will make using the manual easier and increase its effectiveness (Davis). As stated in an article by Karen Kelty "Workers don't have time to scan an entire chapter to find the desired topic, and it's inconvenient to flip back and forth to the table of contents in a two inch thick manual." An article by Clay Morgan offered several useful tips to consider prior to and during writing of the manual such as: consider who will be using the manual, keep it simple, limit general information and organize logically.

Procedure and Methodology

The first step in development of the training manual was to perform a needs analysis. A needs analysis is an examination of the existing need for training within the organization (Mitchell). The first part of the needs analysis was examining the daily operations of the engineering division. Quality of work, productivity of new and veteran employees, problems and errors in projects, mistakes being repeated, turnover of staff and individual knowledge of procedures were all observed and analyzed. The second part of the needs analysis was interviewing several employees to find out what training needs they thought existed. It was discovered that problems and errors were being repeated because information was not being effectively shared between employees. Some employees did not know where to find certain forms and information. Errors and omissions were occurring because employees were not aware of new design criteria or details that had been received from cities and utilities. Veteran employees were spending a great deal of time answering questions from new employees. New employees were being trained by different people and without a formalized training program. This was resulting in different levels of training for each new employee. Due to scheduling and budget demands, new employees were trained only to a level necessary to help complete projects currently being designed. This resulted in additional training needs when new employees moved on to different type projects. It was apparent that both quality and productivity were being negatively impacted by lack of a training manual, which resulted in negative impacts to budget, schedules and client perception of the company.

These findings were then used to define the scope and size of the training manual. It was determined that the manual needed to be easily updated. It needed to be in a format that each employee could have at his desk. It also needed a layout that made it easy to find the specific information the employee was looking for. As Karen Kelty said, "Workers don't have time to scan an entire chapter to find the desired topic, and it's inconvenient to flip back and forth to the table of contents in a two inch thick manual." All standard forms and spreadsheets need to be included in the manual. Design criteria and technical specifications for all each cities and utilities should be included in the manual. AutoCAD standards and procedures should also be included. A section of the manual should also acquaint employees with Peridian Group.

At this point a draft outline for the manual was created. The draft outline was then given to all employees of the engineering department, along with a memo asking for comments regarding the layout of information, as well as, information to be added or deleted. A copy of the memo and draft outline can be found in the Appendix. The comments received were then reviewed and several revisions made to the outline for the training manual. Some comments regarding additional information to be added to the manual were determined to exceed the scope of the initial training manual, but will be considered for addition at a later time, as discussed in the section on Additional Work.

The next step in development of the training manual was to gather all the existing training material that related to the engineering division. The material included design criteria, technical specifications, procedures created by individual employees, design spreadsheets, standard forms, AutoCAD standards, a copy of the employee handbook and other miscellaneous information. At this point it was determined that the large amount of information would not be practical to produce in a paper format for each employee to have at their desk and that all material would need to be in an electronic format. Committee Chair, Herb Tuttle had suggested that maybe the

manual should be placed on the company intranet during review of the proposal for this field project. After determining that all material would need to be in electronic format, it was determined that the company intranet would be the format for publishing the manual. This will allow each employee of the engineering division to have access at their desk. Updates could be made easily and instantly be available to each employee, even in different offices. Being on the company intranet will also make it easier to look up specific information without scanning through the entire manual.

Once the outline for the manual and the format had been finalized, assembly of the manual began. The first step was to place the outline on the company intranet in .html format with database links that could be added as each part of the manual was completed. The next step was to convert all material gathered into electronic format. After material was converted to electronic format it was stored on the computer in a location that would be referenced by a database for easy updating of the manual. An editable intranet page was developed that could be used by administrative staff to help keep the manual updated.

A directory structure that closely matchs the final outline of the training manual became necessary in order to store the large amount of files associated with the training manual. While developing the manual it became apparent that it would be important to be able to tell when information had been updated. A news feature was created that tells users of updates to information whenever the manual was accessed. The final step was to develop material from the final outline that did not already exist. A copy of the final outline for the manual and excerpts from the final manual on the company intranet are included in the Appendix.

Results

The result of the project is a manual to be used by all employees of the engineering division of Peridian Group. The training manual is located on the intranet of Perdian Group. A final outline of the manual can be found in the Appendix.

Suggestions for Additional Work

Several suggestions for additional work were made during the development phase and initial implementation of the training manual. The suggestions for additional work are as follows:

- Create more Land Development Desktop training and procedures. This would include procedures and tips for using different elements of the design software. The design software is used by most all of the engineering staff on a daily basis. Knowledge of the software varies greatly among the engineering division staff.

- Make the training manual useful for other departments. The first three sections of the training manual can be used by all departments of Peridian Group. Sections would be added for information related directly to other departments. Items such as checklist for plats, zoning regulations and planning submittal forms could be added for each city.

- Continual updating of the training manual. New design information and criteria are received on a regular basis. This new information must be added to or updated in the training manual. New cities and utilities may need to be added as projects are started in areas not previously worked in.

- Creation of the checklist for different types of projects. Checklists would be created for storm sewer, sanitary sewer, waterline and roadway plans would be created. The checklist would be altered for each city or municipality.

- Lists and locations of standard AutoCAD blocks and drawings. This would also include example drawings that could be used by new employees.

- Develop a search engine. This would make finding material easier for new employees.

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Appendix